



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/564,936 | 06/29/2006 | Yasushi Nagamune | 102212.57243US | 7164 |

23911 7590 10/06/2009
CROWELL & MORING LLP
INTELLECTUAL PROPERTY GROUP
P.O. BOX 14300
WASHINGTON, DC 20044-4300

| |
|----------|
| EXAMINER |
|----------|

LEGASSE JR, FRANCIS M

| | |
|----------|--------------|
| ART UNIT | PAPER NUMBER |
|----------|--------------|

2878

| | |
|-----------|---------------|
| MAIL DATE | DELIVERY MODE |
|-----------|---------------|

10/06/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

| | | | |
|------------------------------|--|--|--|
| Office Action Summary | Application No. 10/564,936 | Applicant(s) NAGAMUNE ET AL. | |
| | Examiner FRANCIS M. LEGASSE JR | Art Unit 2878 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1,2,9,10,16 and 20 is/are rejected.
- 7) ☒ Claim(s) 3-8,11-15 and 17-19 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 January 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>18 January 2006</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Title

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 2, 9 and 16 are rejected under 35 U.S.C. 102(e) as being anticipated by Watanabe et al. (US Patent No. 6,724,064 B2, “Watanabe”, hereinafter).

Regarding claim 1, Watanabe (*figure 1*) discloses an optical sensor characterized by comprising

- a photoconductive material (12), which generates a carrier inside when irradiated with a light or an electromagnetic wave, and
- a carbon nanotube (2), and by sensing said carrier, which is generated within said photoconductive material (12) by irradiation of said light or electromagnetic wave, through change of electrical conduction of said carbon nanotube (2).

Note: The invention of Watanabe is capability of performing the same functions as it contains the identical structure. Applicant is reminded that an apparatus must overcome the prior art based on structure and not function.

Regarding claim 2, Watanabe (*figure 1*) discloses an optical sensor characterized by comprising a single layer structure (12), where said single layer structure is made up of a plurality of kinds of photoconductive material (In and P) having photoconductivity in different wavelengths.

Regarding claims 9 and 16, Watanabe (*figures 1 and 5C*) discloses an optical sensor characterized in that electrodes (6a, 6b: fig. 1 and 16a, 16b: fig. 5C) connected to opposite ends of said carbon nanotube (2) are provided, and said two electrodes (6a, 6b: fig. 1 and 16a, 16b: fig. 5C) have a comb-like shape and are disposed to be opposed to each other, while a large number of carbon nanotubes (2) including said carbon nanotube (2) are connected in parallel between said two electrodes (6a, 6b: fig. 1 and 16a, 16b: fig. 5C).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein

Art Unit: 2878

were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 10 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Watanabe in view of Stettner et al. (US Patent No. 6,690,019 B2, “Stettner”, hereinafter).

Regarding claims 10 and 20, Watanabe (*figure 1*) discloses an optical sensor characterized by comprising a photoconductive material (12) and a carbon nanotube (2) but fails to teach that a condenser is disposed on a side where said optical sensor is irradiate with said light or electromagnetic wave.

Stettner (*figure 3*) discloses a condenser (13) that is disposed on a side where said optical sensor (6) is irradiate with said light or electromagnetic wave.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the condenser of Stettner in combination with the sensor of Watanabe because it will ensure that the light is properly focused onto the detection element, thus improving the overall quality of the device.

Allowable Subject Matter

Claims 3-8, 11-15 and 17-19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 3, the prior art of record fails to teach alone or in combination an optical sensor wherein, along with the other claimed features, the multilayer structure includes layers of photoconductive material having a wider energy gap at the side being irradiated with a light or an electromagnetic wave.

Regarding claims 4 and 11, the prior art of record fails to teach alone or in combination an optical sensor comprising, along with the other claimed features, a transparent or translucent insulating layer formed between said photoconductive material and said carbon nano-tube.

Regarding claims 5 and 13, the prior art of record fails to teach alone or in combination an optical sensor wherein, along with the other claimed features, the optical sensor has a field effect transistor structure or a single electron transistor structure.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Francis M. LeGasse Jr whose telephone number is (571) 272-9798. The examiner can normally be reached on Monday through Thursday 7:00 am to 5:30 pm E.S.T.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Y. Epps can be reached on (571) 272-2328. The fax phone number for the organization where this application or proceeding is assigned is 571-

Art Unit: 2878

273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Francis M. LeGasse Jr.
Patent Examiner AU 2878
571.272.9798

/Thanh X Luu/
Primary Examiner, Art Unit 2878